Integrated Energy Systems for Hospitals

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Ed Mardiat, Director of CHP Development
Burns & McDonnell Engineering Company , Inc.

Hospitals Interested in CHP Installations, but Barriers Exist

Market Drivers

- Expansion required
  - Under built in 1990's
  - Aging demographics
- New role in community
- 6,000 U.S. hospitals
  - ~0.38 quad/yr of potential savings
- Deregulation introduces uncertainty in long-term project economics

Market Needs

- Knowledge about:
  - CHP benefits especially at executive level
  - Technology advances
- Decisions influenced by:
  - CFO
  - VP of Operations
  - Facility managers
  - Consulting engineers
- Incentives

Overcoming Barriers to CHP

- Case studies demonstrate economic potential of CHP
- CHP Application Centers increasing CHP visibility at state level especially in Midwest
- Integrated Energy Systems tailored to specific needs

Case Studies Available

Advocate South Suburban Hospital
Beloit Memorial Hospital
Children's Hospital
Hospital in Washington State
Lake Forest Hospital
Little Company of Mary Hospital
Northwest Community Hospital
Presbyterian Homes
Resurrection Hospital
St Francis Hospital
University of California - Davis Medical Center

www.bchp.org/hospitals/

0.3-5 MW IES for District Applications

Burns and McDonnell Team

– Reduce Austin Energy's air emissions and cost with 5 MW turbine integrated with 2,500 RT of waste-heat absorption cooling

Honeywell Laboratories Team

– Improve Ft. Bragg energy security with 5 MW turbine integrated with 1,000 RT waste-heat chiller and steam generator

Gas Technology Institute Team

– Isolate facilities from grid with engine generator (290 kW to 770 kW) integrated with absorption chillers

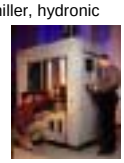
70-300kW IES for Building Applications

United Technologies/Capstone Team

– Commercialize packaged system of four 60 kW microturbines integrated with 110 RT PureComfort waste-heat fired chiller. Maintenance by Carrier

NiSource Team

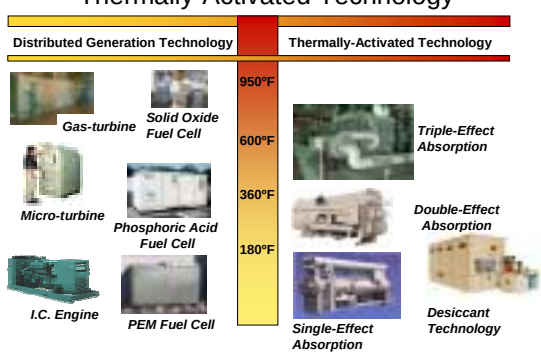
– Improve power quality with three 60 kW microturbines integrated with chiller, hydronic heating, neural network control



Ingersol-Rand Team

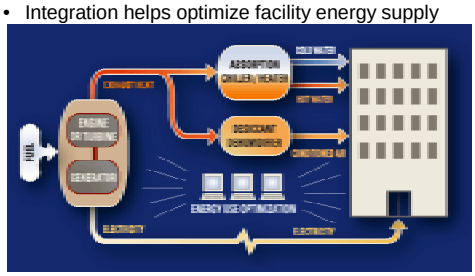
– Meet supermarket needs with 70-100 kW microturbine integrated with waste-heat fired absorption refrigeration

Systems Integrate On-site Energy and Thermally-Activated Technology

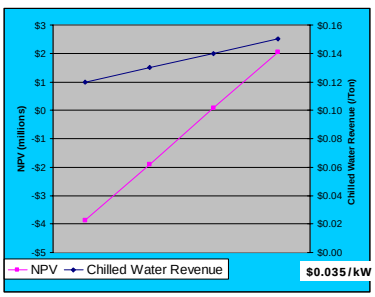


CHP Tomorrow: Integrated Energy Systems Remove Barriers, Improve Products

- Up to 30% lower capital cost
- 1/3 less time and lower cost for installation
- Standardized interfaces
- Integration helps optimize facility energy supply



Chilled Water Rate Drives Project Economics



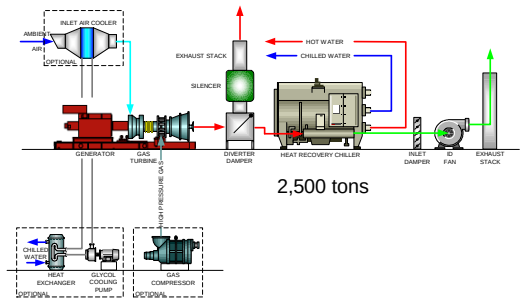
32% of hospital electricity use is for air conditioning

79% of hospital thermal energy is for HVAC

Source: Clark Energy

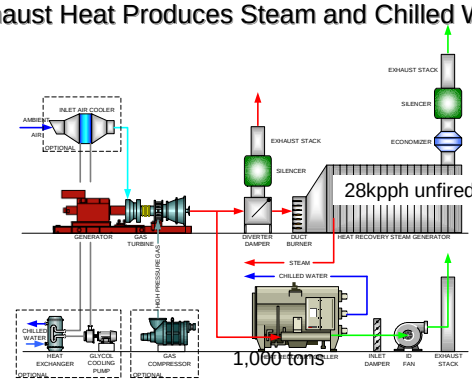
Reference: Burns & McDonnell

CHP System in Austin, TX
Exhaust Heat Produces Chilled Water



2,500 tons

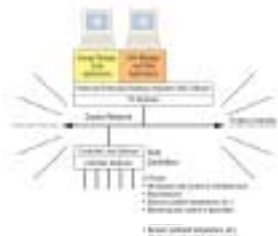
CHP System in Ft. Bragg, NC
Exhaust Heat Produces Steam and Chilled Water



1,000 tons

Integrated Energy Systems Advance Systems Controls

- Optimize system performance on:
  - Cost savings,
  - Energy reliability for critical uses
  - Compliance with emissions permit,
- Multiple operating scenarios



Integrated Energy Systems
Overcoming Barriers to CHP

Partnerships and Information

- DOE/ORNL and ASHE partner to disseminate information
- Technical assistance available through CHP Application Centers

Technology

- Field demonstrations
- Optimized systems meet specific facility needs
- Tools help building owners understand application and economic potential